

National Unit Specification: general information

UNIT Preparing Hydraulic Mortars and Building and Repointing
Traditional Rubble Masonry with Various Lime Mortars
(Intermediate 2)

NUMBER D3VH 11

COURSE

SUMMARY

On completion of this unit, the candidate will be competent in batching gauged hydraulic mortars, in building and general masonry repointing with various lime mortars and will demonstrate an understanding of traditional building processes using lime.

OUTCOMES

- 1 Batch hydraulic lime mortars.
- 2 Point and repoint traditional masonry structures using pinnings and lime mortars to replicate the traditional masonry characteristics.
- 3 Build traditional masonry structures using various lime mortars to match original appearances and properties.

RECOMMENDED ENTRY

This unit is designed to compliment other SVQs in construction, and particularly Stonemasonry at Level 2 and candidates would normally be expected to be receiving complimentary industrial experience in stonemasonry and should have completed unit D3VG-11: Preparing and using basic lime mixes or the Scottish Lime Centre's pre-unit assignment in traditional lime mortars.

CREDIT VALUE

0.5 Credit at Intermediate 2.

Administrative Information

Superclass: TG

Publication date: January 2001

Source: Scottish Qualifications Authority 2001

Version: 01

© Scottish Qualifications Authority 2001

This publication may be reproduced in whole or in part for educational purposes provided that no profit is derived from reproduction and that, if reproduced in part, the source is acknowledged.

Additional copies of this unit specification can be purchased from the Scottish Qualifications Authority. The cost for each unit specification is £2.50 (minimum order £5.00).

CORE SKILLS

Information on the automatic certification of any core skills in this unit is published in *Automatic Certification of Core Skills in National Qualifications* (SQA, 1999).

National Unit Specification: statement of standards

UNIT Preparing Hydraulic Mortars and Building and Repointing Traditional Rubble Masonry with Various Lime Mortars (Intermediate 2)

Acceptable performance in this unit will be the satisfactory achievement of the standards set out in this part of the unit specification. All sections of the statement of standards are mandatory and cannot be altered without reference to the Scottish Qualifications Authority.

OUTCOME 1

Batch Hydraulic Lime Mortars.

Performance criteria

- a) Basic hand tools and equipment are correctly selected and workspace identified and prepared before undertaking works.
- b) The limes, aggregates and additives for the mix are accurately selected and correctly measured by volume and weight to the given specification of the mix.
- c) Fluids are added in the correct sequence according to the given specification.
- d) Lime materials, aggregates and additives are handled and stored in accordance with current practice and relevant health and safety legislation.
- e) Work area and equipment are appropriately cleaned and equipment stored safely in accordance with current practice.

Note on range for the outcome

Limes: non-hydraulic lime putty; non-hydraulic lime hydrate; various hydraulic limes.

Aggregates: coarse sands; fine sands; crushed stone; crushed brick.

Mixes: pre-mixed coarse stuff; pre-mixed fine stuff.

Additives: pozzolans; common additives.

Equipment: hand tools; powered mixer; safety wear.

Evidence requirements

Please refer to *Evidence requirements for the unit* at the end of the Statement of Standards.

National Unit Specification: statement of standards (cont)

UNIT Preparing Hydraulic Mortars and Building and Repointing Traditional Rubble Masonry with Various Lime Mortars (Intermediate 2)

OUTCOME 2

Point and repoint traditional masonry structures using pinnings and lime mortars to replicate the traditional masonry characteristics.

Performance criteria

- a) The original masonry characteristics and behaviour are correctly identified.
- b) An appropriate repair strategy is identified.
- c) Tools and equipment for the given task are selected correctly.
- d) The materials for the mix are accurately selected and correctly measured by volume and weight to the given specification of the mix.
- e) Masonry beds and joints are correctly prepared to receive traditional lime mortar.
- f) Mortar and pinnings are used to minimise shrinkage of the mortar and match the originally identified characteristics and behaviour of the masonry or to specification.
- g) Mortar joints are finished to match the existing repair strategy.
- h) Appropriate protective steps are taken to protect and cure the mortar.

Note on range for the outcome

Masonry materials: sandstone; whinstone; limestone; granite.

Finishes: flush pointing; lined out flush pointing; to receive harling and surface coatings; “weathered” pointing.

Equipment: hand tools; powered mixer; safety wear.

Basic hand tools: pointing trowels and keys; chisels – clourer, mel point, dooking iron, lifter, splitter; hawk; churn brush; stipplier, drags and larrys; floats; hammer – brick, club, carvers mel; tile trowel; bricklayers trowel; harling trowel.

Evidence requirements

Please refer to *Evidence requirements for the unit* at the end of the Statement of Standards.

OUTCOME 3

Build traditional masonry structures using various lime mortars to match original appearances and properties.

Performance criteria

- a) The original masonry characteristics and behaviour are correctly identified.
- b) An appropriate repair strategy is identified.
- c) Tools and equipment for the given task are selected correctly.
- d) The materials for the mix are accurately selected and correctly measured by volume and weight to the given specification of the mix.

National Unit Specification: statement of standards (cont)

UNIT Preparing Hydraulic Mortars and Building and Repointing Traditional Rubble Masonry with Various Lime Mortars (Intermediate 2)

- e) Stones are bedded and joints are correctly prepared to receive traditional lime mortar.
- f) Mortar and pinnings are used to minimise shrinkage of the mortar and match the originally identified characteristics and behaviour of the masonry or to specification.
- g) Mortar joints are finished to match the existing repair strategy.
- h) Appropriate protective steps are taken to protect and cure the mortar.

Note on range for the outcome

Masonry materials: sandstone; whinstone; limestone; granite.

Finishes: flush pointing; lined out flush pointing; to receive harling and surface coatings; “weathered pointing”.

Equipment: hand tools; powered mixer; safety wear.

Basic hand tools: pointing trowels and keys; chisels – clourer, mel point, dooking iron, lifter, splitter; hawk; churn brush; stipplier, drags and larrys; floats; hammer – brick, club, carvers mel; tile trowel; bricklayers trowel; harling trowel.

Evidence requirements

Please refer to *Evidence requirements for the unit* at the end of the Statement of Standards.

EVIDENCE REQUIREMENTS FOR THE UNIT

Outcome 1

Performance evidence is needed to show the candidate can work individually to select, batch and gauge lime mortars using materials and tools across the range for the purposes of building and repointing traditional rubble masonry walling.

All working practices must be in accordance with current and relevant health and safety legislation and regulations.

Outcome 2

Performance evidence is needed to show the candidate can use the correct tools and equipment in a safe manner in order to point and repoint traditional masonry structures. The candidate should also demonstrate an awareness of the different types of pointing across the range of traditional masonry structures.

All working practices must be in accordance with current and relevant health and safety legislation and regulations.

All the performance criteria must be met and all items in the range statement covered.

National Unit Specification: statement of standards (cont)

UNIT Preparing Hydraulic Mortars and Building and Repointing Traditional Rubble Masonry with Various Lime Mortars (Intermediate 2)

Outcome 3

Performance evidence is needed to show the candidate can build traditional masonry structures using lime and finish and protect the mortar against a variety of weather conditions using the approaches described in the Range Statement.

All working practices must be in accordance with current and relevant health and safety legislation and regulations.

All the performance criteria must be met and all items in the range statement covered.

National Unit Specification: support notes

UNIT Preparing Hydraulic Mortars and Building and Repointing Traditional Rubble Masonry with Various Lime Mortars (Intermediate 2)

This part of the unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this unit is at the discretion of the centre, the notional design length is 20 hours.

GUIDANCE ON THE CONTENT AND CONTEXT FOR THIS UNIT

The candidate successfully completing this unit will be given underpinning knowledge relating to the batching and gauging of hydraulic lime mortars and to the repointing and rebuilding to match of traditional masonry structures.

The unit would be offered to candidates from the construction and related service industries and trades. The skills are transferable within different working environments but the unit is aimed at candidates whose normal place of work would be a site, a conservation project or a similar working environment.

The range statement is applicable to all areas of construction or other related industries but specifically includes the safe working practices associated with the hazard represented by working with lime based mortars and the regulations pertaining to the use of personal protective equipment.

The unit deals specifically in the mixing of lime-mortars and their use in repairing traditional masonry structures using lime mortars but is complimented by other units in Stonemasonry.

With regard to specific outcomes, the underpinning knowledge delivered in the unit will cover:

Outcome 1

Candidates should produce 15 litres of gauged lime mortar course stuff that is 90% free of lumps and pockets of unmixed lime material. It should also be 100% free of dry crumbly coarse stuff. Pure lime mortar course stuff should be 100% blended with hydraulic lime and the minimum amount of water should be added to achieve thorough blending with no colour variation. The mortar should be plastic and ready for use.

The variety of specifications for lime mortars; measuring, weighing and gauging techniques; health and safety factors and safe working practices associated with handling lime materials; different mixes for different applications; the characteristics and technology of hydraulic lime and hydraulic setting in relation to the lime cycle.

The following safety requirements apply: HSW (Health and Safety at Work etc) Act; COSHH (Control of Substances Hazardous to Health) Regulations; Manual Handling Operations. In addition, candidates will be made aware of the terms of The Stirling Charter (for the Conservation of Scotland's Built Heritage).

National Unit Specification: support notes (cont)

UNIT Preparing Hydraulic Mortars and Building and Repointing Traditional Rubble Masonry with Various Lime Mortars (Intermediate 2)

Outcome 2

Candidates should assess and re-point half a square metre of traditional rubble masonry of varying joint widths (<75mm and >5mm) using traditional lime mortar. Original work is taken into account and joints wider than 15mm and/or deeper than 25mm are appropriately pinned. The work should be properly protected during the curing process.

The techniques of evaluating structures; reasons for shrinkage in lime mortars and the means of avoiding shrinkage; stone types and their characteristics and behaviours; construction techniques including traditional rubble, coursed rubble, squared rubble; curing techniques; aftercare approaches and demands.

The following safety requirements apply: HSW (Health and Safety at Work etc) Act; COSHH (Control of Substances Hazardous to Health) Regulations; Manual Handling Operations. In addition, candidates will be made aware of the terms of The Stirling Charter – Conserving Scotland’s Built Heritage.

Outcome 3

Candidates will be given a wall to be repaired of 1.5m long x 600mm x 750mm high. This wall will have an incomplete section will be finished by a dressed ashlar scuntion tailed into the rubble on both faces. The ashlar built on must be 3 courses high. The candidate will be required to build on the prepared rubble and corners to match the existing and point up the joints on completion. The candidate will be required to mix mortar to a specification for each aspect of the work in the quantities required.

One rubble face is to be in sandstone rubble. The other face is to be in random impervious stone such as whin, congolmerate (pudding stone) or granite.

The techniques of evaluating structures; reasons for shrinkage in lime mortars and the means of avoiding shrinkage; stone types and their characteristics and behaviours; construction techniques including traditional rubble, coursed rubble, squared rubble; curing techniques; aftercare approaches and demands.

Pinning stones are to be used to reduce joint widths to less than 10mm and to maintain stability plumb and level in the rubble stones.

The following safety requirements apply: HSW (Health and Safety at Work etc) Act; COSHH (Control of Substances Hazardous to Health) Regulations; Manual Handling Operations. In addition, candidates will be made aware of the terms of The Stirling Charter – Conserving Scotland’s Built Heritage.

National Unit Specification: support notes (cont)

UNIT Preparing Hydraulic Mortars and Building and Repointing Traditional Rubble Masonry with Various Lime Mortars (Intermediate 2)

Assessment Checklist

Ashlar scuntion

3 courses – 1 double header, 4 corners rybats, 2 closers		E
Plumbed from existing	+/-1mm	E
Battered from existing	+/-1mm	E
90 degree angle using square	+/-2mm	E
Beds and Joints	+/-1mm	E

Random rubble

Random with pinner to match existing both faces		E
Alignment	+/-3mm	E
Finished height	+/-5mm	E
No risbond joints		E
Bonded to the core		E
Bonded to the corner rybats		E

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

The achievement of skills and underpinning knowledge required for this unit will be assisted by the provision of information sources in the form of: oral and/or written instructions; graphic and photographic materials; technical information and examples from manufacturers of previously mixed lime mortars; codes of practice; building standards; statutory regulations; hands-on examination of sound and decayed lime-based mortars in rubble masonry construction.

Tutors will demonstrate practical elements step-by-step until the candidate feels competent enough to attempt them on his/her own. The requirement to adopt safe working practices and comply with safety legislation will be emphasised throughout.

GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

Outcome 1 PC (a – e) Practical exercise and structured questions

The candidate will be presented with a practical exercise to test competence in batching and gauging hydraulic mortars.

Satisfactory performance will be demonstrated by the candidate meeting the performance criteria and evidence requirements including safe working practices associated with hydraulic mortars.

Where evidence of underpinning knowledge cannot be inferred from the candidate's performance in the practical exercise, structured questions could be used to allow the candidate to cover gaps.

National Unit Specification: support notes (cont)

UNIT Preparing Hydraulic Mortars and Building and Repointing Traditional Rubble Masonry with Various Lime Mortars (Intermediate 2)

Outcome 2 PC (a – e) Practical exercise and structured questions

The candidate will be presented with a practical exercise to test competence in repointing traditional masonry structures.

Satisfactory performance will be demonstrated by the candidate meeting the performance criteria and evidence requirements including compliance with a predetermined specification for the restoration/replication work.

Where evidence of underpinning knowledge cannot be inferred from the candidate's performance in the practical exercise, structured questions could be used to allow the candidate to cover gaps.

Outcome 3 PC (a – e) Practical exercise and structured questions

The candidate will be presented with a practical exercise to test competence building traditional masonry structures to match original appearances and properties using various lime mortars.

Satisfactory performance will be demonstrated by the candidate meeting the performance criteria and evidence requirements including compliance with a predetermined specification for the restoration/replication work.

Where evidence of underpinning knowledge cannot be inferred from the candidate's performance in the practical exercise, structured questions could be used to allow the candidate to cover gaps.

SPECIAL NEEDS

This unit specification is intended to ensure that there are no artificial barriers to learning or assessment. Special needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments or considering special alternative outcomes for units. For information on these, please refer to the SQA document *Guidance on Special Assessment and Certification Arrangements for Candidates with Special Needs/Candidates whose First Language is not English* (SQA, 1998).